6TH GRADE

RANDOLPH SCHOOL MATHEMATICS TOURNAMENT
APRIL 28, 2007

There are 30 multiple-choice questions and three tiebreakers on this test. Mark your answers on the scantron sheet. If none of the answers is correct, <u>choose E</u>. No aids such as calculators, notes, books, etc., may be used in completing the test. You may write on the test and use the scratch paper <u>attached to the back of this test</u>.

Your score on this examination will be computed as *FOUR TIMES THE NUMBER CORRECT MINUS THE NUMBER INCORRECT*. Blanks are not counted as correct or incorrect in computing the score.

The tiebreakers count one-tenth of one point. Work on the tiebreakers only after you have completed all the multiple-choice questions. Write the answers to the tiebreakers in the designated spaces on the scantron sheet.

The time limit on the test is *one hour*. If you finish before time is called, <u>you may leave the room but must also leave the testing area</u>.

6th Grade Test

1. Solve for x. $2x - 11 = 5x + 10$
   A. –7   B. –3   C. 3   D. 7

2. Evaluate. $\dfrac{2}{3} \cdot 12 + 4 - 2\left(5\dfrac{1}{4}\right)$
   A. –2.5   B. 1.25   C. 1.5   D. 18.5

3. What is the area in square inches of a right triangle with a hypotenuse of 13 inches and one leg that is 12 inches?
   A. 78   B. 65   C. 60   D. 30

4. How many distinct arrangements are there for the letters in the word ALABAMA?
   A. 6   B. 24   C. 120   D. 210

5. Simplify. $\sqrt{169 - 144} + \sqrt{100 - 64}$
   A. 51   B. 11   C. 3   D. $1 + \sqrt{2}$

6. If $a \int b = \sqrt{ab} - \sqrt[3]{a}$, find the value of $8 \int \left(8 \int 2 \right)$.
   A. 2   B. 8   C. 9   D. 16

7. Simplify. $5|4 - 7| - |3 - 11|$
   A. –23   B. –7   C. 7   D. 23

8. Jason purchased a jacket that was discounted 30%. If the original price of the jacket was $75 and 8% sales tax was added to the discounted price, how much did Jason have to pay for the jacket?
   A. $56.70   B. $54.00   C. $48.60   D. $58.50

9. What is the perimeter in feet of a semicircular flower bed with a diameter of 7 feet?
   A. 7π B. $\dfrac{7\pi}{2}$ C. $\dfrac{14\pi + 7}{2}$ D. $\dfrac{7\pi + 14}{2}$

10. What are the odds against rolling a multiple of six on a standard pair of six-sided dice?
    A. 31:5   B. 29:7   C. 5:1   D. 6:1

11. What is the sum of the last four digits of 2007! ?
    A. 0   B. 9   C. 10   D. 28

12. How many perfect cubes are between 110 and 550?
    A. 2   B. 3   C. 4   D. 5

13. What is the probability of drawing a red card or a king on the first draw from a standard deck of playing cards?
    A. $\dfrac{15}{26}$ B. $\dfrac{7}{13}$ C. $\dfrac{17}{26}$ D. $\dfrac{8}{13}$

14. What is the area of pentagon ABCDE in square units
    if angles A, E, and D are right angles,
    $AB = CD = 8$ units, $AE = DE = 18$ units,
    and $BC = 10\sqrt{2}$ units?
    A. $52 + 10\sqrt{2}$ B. $144\sqrt{2}$
    C. 274   D. 224
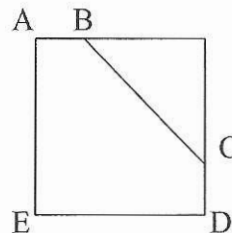
15. In a basketball game, one team's score was two points less than half the other
    team's score. If a total of 52 points was scored in the game, find the difference in
    the scores of the two teams.
    A. 16   B. 20   C. 24   D. 36

16. The measure of the supplement of an angle is 18 degrees greater than three times
    the measure of the complement of the angle. Find the degree measure of the
    complement.
    A. 126   B. 36   C. 54   D. 144

17. Bette rode her bike five miles to a friend's house. On the way home she had a flat
    tire after one mile and walked the remainder of the distance home. If her total
    traveling time was two hours and her average rate walking is 3 mph, find the
    average rate in mph at which she rides her bike.
    A. 21   B. 18   C. 9   D. 3
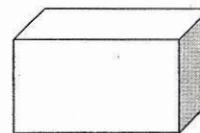
18. How many rectangles are in the figure shown
    if all angles are right angles?
    A. 30   B. 32
    C. 34   D. 36
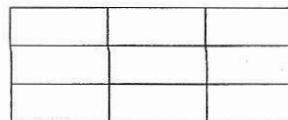
19. The surface area of a cube is 96 square units.
    If the length is increased by two and the width
    is decreased by two while the height stays the same,
    what is the number of cubic units in the volume
    of the resulting rectangular solid?
    A. 32   B. 48   C. 64   D. 72

20. A jar contains 9 yellow pegs, 15 green pegs, 17 red pegs and 10 blue pegs. What is
    the probability of randomly selecting a blue peg from the jar and then a red peg,
    without replacement?
    A. $\dfrac{1}{15}$ B. $\dfrac{8}{15}$ C. $\dfrac{9}{17}$ D. $\dfrac{1367}{2550}$

21. Evaluate. $2! + 0! + 0! + 7!$
   A. 53   B. 2007   C. 5042   D. 5044

22. What is 10201_3 written as a base ten number?
    A. 363   B. 100   C. 85   D. 83

23. What is the square root of the sum of the first nine prime numbers?
    A. $2\sqrt{17}$ B. $2\sqrt{23}$ C. $7\sqrt{2}$ D. 10

24. Three boys and two girls are to seat themselves in five chairs sitting in a row. In how many ways can the five people sit if no two boys can sit next to each other?
    A. 120   B. 24   C. 12   D. 6

25. The lengths of the sides of a triangle are consecutive odd numbers. If the perimeter of the triangle is 237. What is the length of the longest side?
    A. 77   B. 79   C. 81   D. 83

26. Evaluate. $5^2 + 4^3 + 3^4 + 2^5$
    A. 202   B. 185   C. 187   D. 178

27. Solve for x. $9^x = 3^{12}$
    A. 4   B. 6   C. 12   D. 24

28. Excluding one and itself, how many positive integers are factors of 1800?
    A. 72   B. 68   C. 36   D. 34

29. The area of the shaded region is 33π cm^2.
    If the radius of the smaller circle is 4 cm and the circles
    are tangent, how long in cm is the diameter of the larger circle?
    A. 7   B. 14
    C. 14π D. 16π

30. What is the smallest sum of four distinct, non-prime, positive integers which have no common factor greater than one?
    A. 30   B. 39   C. 54   D. 87
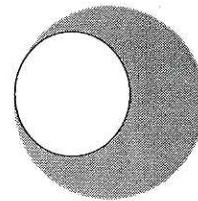
Tie Breakers

1. If $0.2\overline{007}$ is written as the fraction $\dfrac{p}{q}$ where p and q have no common factors other than one, find $q - p$.

2. Solve for x. $5^5 + 5^5 + 5^5 + 5^5 + 5^5 = x^2$

3. Solve for x. $\sqrt[3]{\sqrt{2x}} = \sqrt[6]{4014}$